

Claims

- [c1] An x-ray generating assembly comprising:
- an x-ray source assembly mounted to a mounting element;
 - a support assembly comprising:
 - a motor element;
 - a gear assembly in communication with said motor element; and
 - an output shaft in communication with said gear assembly such that said output shaft rotates in response to said motor element, said mounting element positioned around said output shaft; and
 - an electromechanical lock engaged to said mounting element such that said electromechanical lock rotates in concert with said mounting element, said electromechanical lock having an engaged condition and a disengaged condition, said electromechanical lock engaging said output shaft when said electromechanical lock is in said engaged condition such that said mounting element rotates with said output shaft, said mounting element free to rotate about said output shaft when said electromechanical lock is in said disengaged condition.

- [c2] An x-ray generating assembly as described in claim 1, wherein said electromechanical lock moves from said engaged condition to said disengaged condition when said electromechanical lock becomes energized.
- [c3] An x-ray generating assembly as described in claim 1, wherein said gear assembly comprises a high reduction worm gear assembly.
- [c4] An x-ray generating assembly as described in claim 1, wherein said gear assembly includes a back-drive force greater than a locking force of said electromechanical lock.
- [c5] An x-ray generating assembly as described in claim 1, wherein said x-ray source is suspended from a supporting structure by said output shaft.
- [c6] An x-ray generating assembly as described in claim 1, further comprising:
a controller in communication with said motor element, said controller including logic adapted to control the position of said x-ray source assembly.
- [c7] An x-ray generating assembly as described in claim 1, wherein said output shaft comprises a hollow output shaft.

- [c8] An x-ray generating assembly as described in claim 7, further comprising:
a source positioning shaft positioned within said output shaft, said source positioning shaft engaged to said x-ray source assembly such that said source positioning shaft rotates with said x-ray source assembly at all times.
- [c9] An x-ray generating assembly as described in claim 8, further comprising:
a feedback device in communication with both said source positioning shaft and said support assembly such that the position of said x-ray source assembly can be determined at all times.
- [c10] An x-ray generating assembly as described in claim 9, wherein said feedback device is an optical encoder.
- [c11] An x-ray generating assembly as described in claim 9, wherein said feedback device is in communication with said controller.
- [c12] An x-ray generating assembly comprising:
an x-ray source assembly mounted to a mounting element;
a primary structural support assembly supporting said x-ray source assembly comprising:

a motor element;
a gear assembly in communication with said motor element; and
an output shaft coupled with said gear assembly such that said output shaft rotates in response to said motor element; and
an electromechanical lock having an engaged condition and a disengaged condition, said x-ray source assembly engaged to said output shaft when said electromechanical lock is in said engaged condition, said x-ray source assembly free to rotate about said output shaft when said electromechanical lock is in said disengaged condition.

[c13] An x-ray generating assembly as described in claim 12, wherein said gear assembly comprises a high reduction worm gear assembly.

[c14] An x-ray generating assembly as described in claim 12, wherein said gear assembly includes a back-drive force greater than a locking force of said electromechanical lock.

[c15] An x-ray generating assembly as described in claim 12, further comprising:
a controller in communication with said motor element, said controller including logic adapted to control the po-

sition of said x-ray source assembly.

[c16] An x-ray generating assembly as described in claim 12, further comprising:

a feedback device in communication with both said primary structural support assembly and said x-ray source assembly such that the relative position of said x-ray source assembly can be determined at all times.

[c17] An x-ray generating assembly as described in claim 12, further comprising:

a source positioning shaft positioned within said output shaft, said source positioning shaft engaged to said x-ray source assembly such that said source positioning shaft rotates with said x-ray source assembly at all times, said output shaft comprises a hollow output shaft; and

a feedback device in communication with both said source positioning shaft and said primary structural support assembly such that the position of said x-ray source assembly can be determined at all times.

[c18] A method of positioning an x-ray source assembly comprising:

supporting the x-ray source assembly on a support assembly including an output shaft, said output shaft in communication with a motor element;

communicating rotational movement from said motor element to said output shaft by means of a worm gear assembly in communication with said motor element and said output shaft;

engaging an electromechanical lock whereby the x-ray source assembly is coupled to said output shaft; and
disengaging said electromechanical lock such that the x-ray source assembly is free to rotate about said output shaft.

[c19] A method of positioning an x-ray source assembly as described in claim 18, further comprising:
monitoring the rotational position of the x-ray source assembly using a feedback device in communication with both the x-ray source assembly and said support assembly.

[c20] A method of positioning an x-ray source assembly as described in claim 19, further comprising:
using a controller to automate movement of the x-ray source assembly, said controller in communication with said motor element, said electromechanical lock, and said feedback device.